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Chronic medical conditions and mental health in older people: disability and psychosocial resources mediate specific mental health effects

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ABSTRACT

Background. This study describes the differences in psychological distress, disability and psychosocial resources between types of major medical conditions and sensory impairments (collectively denoted as CMCs); and tests whether disability and psychosocial resources mediate CMC-specific mental health effects.

Methods. Data were obtained from a population-based, cross-sectional survey of 5078 non-institutionalized, late middle-aged and older Dutch persons. The predictors were 16 types of CMCs, including all major chronic medical diseases as well as impairment of hearing, vision, and cognition. The outcomes were assessed in terms of psychological distress as measured by the Hospital Anxiety and Depression Scale. Two aspects of disability were measured (namely, physical and role functioning) and also three psychosocial resources (namely, mastery, self-efficacy and social support).

Results. Level of psychological distress varied across type of CMC. Hearing impairment, neurological disease, vision impairment, and lung and heart disease had particularly strong associations with distress. The level of distress in patients with hearing impairment was 0·45 standard deviation higher than in those without hearing impairment (adjusted for demographics and all other CMCs). Roughly similar patterns of association were found between type of CMC and disability, and also, but to a lesser extent, mastery and self-efficacy. Stepwise multiple regression revealed that type of CMC accounted for 9% of the variance in distress initially, but this fell to 1% after the variance due to disability, mastery and self-efficacy was taken out. Social support was not a mediator. Disability and psychosocial resources accounted for 13% and 14% of the variance in distress, respectively.

Conclusion. These results support the conventional wisdom that it is not the nature of the condition that determines psychological distress, but instead the severity of the disability and loss of psychological resources associated with the condition on the one hand and the psychological characteristics of the patient on the other.

INTRODUCTION

Chronic medical disease and sensory impairments (collectively denoted as chronic medical conditions, or CMCs) are common in the elderly population. In addition, patients with CMCs are more likely than those without CMCs to experience symptoms of depression (Berkman *et al.* 1986; Palinkas *et al.* 1990; Bowling & Farquhar, 1991; Williamson & Schulz, 1992) and anxiety (Viney & Westrbrook, 1981; Nickel *et al.* 1990), and are less able to control many aspects of their lives (Pearlin & Schooler, 1978;

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Felton & Revenson, 1984; Roberts *et al*. 1994). Impaired psychological functioning has been found in chronic conditions such as lung disease (Borson *et al*. 1986; Williams, 1989), rheumatoid arthritis (Anderson *et al*. 1985; Newman *et al*. 1989), cancer (Cassileth *et al*. 1985; Ell *et al*. 1989), stroke (Thompson *et al*. 1989; Castillo *et al*. 1993) and myocardial infarction (Terry, 1992). As the prevalence of many CMCs increases with age, older adults are potentially at risk for increased psychological distress (Gurland, 1983; Berkman *et al*. 1986; Copeland *et al*. 1987; Newman, 1989; Blazer *et al*. 1991; Beekman *et al*. 1995*a*, *b*).

However, little is known about the extent to which CMCs differ in the degree of psychological distress they inflict on people. Some researchers have found psychological adaptation among chronically ill patients to be independent of type of CMC (Cassileth *et al*. 1984; Arin *et al*. 1990), suggesting that the mental health status of chronically ill patients reflects enduring psychosocial vulnerability rather than CMC-specific effects. Other researchers have reported large differences in psychological status across different types of CMCs (Murrell *et al*. 1983; Felton *et al*. 1984; Koenig *et al*. 1988; Coulehan *et al*. 1990; Palinkas *et al*. 1990). Whether these differences in distress can be accounted for by differences between CMCs in their risk for psychological distress has not been examined systematically. These CMC-specific risks may be triggered by biological factors such as structural and neurochemical changes of the brain (e.g. in stroke and parkinsonism) and aberrations of immune-system functioning (e.g. in rheumatoid arthritis). Symptoms of anxiety and depression may also arise in response to the increased disability and reduced psychosocial resources that accompany some CMCs more than others (Aneshensel *et al*. 1984; Friedland & McColl, 1992). CMCs may differ to the extent that patients have to cope with loss of their usual physical functions, social roles and sometimes even their independence. In addition, CMC may differ to the extent that psychosocial resources are diminished by the negative effects of CMCs on relationships, income and housing, social support, body image, and feelings and cognitions of control and self-efficacy.

The study reported here sought: (*i*) to describe the differences in psychological distress, disability, and psychosocial resources between types of CMCs; and (*ii*) to test whether loss of resources mediate the differences in distress between types of CMCs. Consequences of disease for two broad resources are proposed as mediators of the effects of CMCs on mental health status: disability in the form of physical and role limitations, and loss of psychosocial resources in the form of reduced mastery, self-efficacy and social support. There is considerable empirical support for an association of severity of physical and social disability with depressive and anxiety symptom levels (Kaplan *et al*. 1987; Gurland *et al*. 1988; Turner & Noh, 1988; Kennedy *et al*. 1989; Prince *et al*. 1997). Therefore, it seems reasonable to hypothesize that differences in disability account partly for differences in distress between types of CMCs (see path a–b in Fig. 1). In addition, illness controllability may help to explain differences in distress between CMCs (Felton & Revenson, 1984). While cardiac conditions and diabetes are often responsive to self-management, conditions such as cancer offer fewer opportunities for personal and medical control. In such cases, loss of psychosocial resources could account for an increase in depressive and anxiety symptoms (Felton & Revenson, 1984; Felton *et al*. 1984). As an independent mediator, differences in loss of psychosocial resources between types of CMCs might mediate the different mental health effects from CMCs (see Fig. 1 path e–d).

In addition to these direct mediating effects, disability and psychosocial resources are also hypothesized to have indirect mediating effects (see Fig. 1 paths a–c–d and e–f–b). Patients with disabilities may have difficulty maintaining psychosocial resources (Viney & Westbrook, 1982). As a result, patients with CMCs involving greater degrees of disability – arthritis or stroke, for example (Johnson & Wolinsky, 1993; Boult *et al*. 1994) – may have fewer psychosocial resources than those with conditions involving relatively little disability (diabetes or hypertension). In this way, resources could mediate the effect of disability on mental health too (see Fig. 1 path a–c–d). On the other hand, disability could mediate the effect of reduced psychosocial resources on mental health (see Fig. 1 path e–f–d). Particular CMCs, such as early stages of cancer, may reduce psychosocial resources, without having any direct impact on disability,

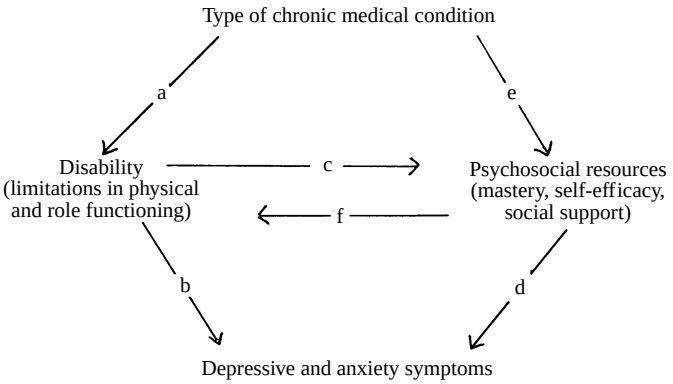

FIG. 1. A schematic presentation of the presumed causal pathways.

but solely because of the awareness that one is carrying the disease. The loss of psychosocial resources may then affect functioning, especially role functioning.

Thus, the current study addressed two main questions: (1) Are there differences in mental health, disability, and psychosocial resources according to type of CMC?; and (2) Can CMC-specific differences in mental health be explained by the differential associations of CMCs with disability and resources? Stepwise multiple regression was used to examine the mediation hypothesis.

METHOD

The Groningen Longitudinal Ageing Study (GLAS) is a population-based prospective follow-up study of the determinants of health-related quality of life of older people (Kempen & Ormel, 1996; Kempen *et al.* 1997*a*, *b*). The study's primary objective is to identify the psychosocial factors that influence the trajectory of quality of life with ageing, independently or in conjunction with factors related to chronic medical conditions.

Subjects

The source population was late middle aged and older persons who were living independently or in adapted housing for the elderly in the north of The Netherlands. The study population comprised the 8723 persons aged 57 and older on 1 January, 1993, who were on the patient panels of the 27 general practitioners (GPs), most of whom participate in the Morbidity Registration Network Groningen (RNG). By letter, GPs asked eligible subjects for permission to provide their names and addresses to the GLAS research team. A total of 1937 refused (22·2%). Of the remaining 6786, 1277 declined cooperation when contacted by the research team, and 152 had died or left the practice by the time contact was initiated. Another 78 subjects were excluded because of severe cognitive impairments (a score of < 17 on the Mini-Mental State Examination (MMSE) at the time of baseline assessments (Folstein *et al.* 1975). Useful baseline data are available for 5279 subjects. The GLAS baseline assessment was carried out in 1993/4 and consisted of an interview and a mailed questionnaire. The subjects were interviewed face-to-face in their homes ($N = 4792$) or by telephone ($N = 487$) by trained female interviewers, aged 35 to 50. Subjects older than 84 were excluded from the analyses because of the relatively high non-response rate in this age group (see below). Thus, the analyses presented below are based on 5078 persons aged 57 to 84 (64% response rate).

Predictors

Active chronic medical conditions (*CMCs*)

A checklist of 19 chronic medical conditions was used in the interview phase of baseline data collection. Respondents were asked whether they had any of these 19 conditions during the 12 months prior to the interview. The same procedure is used by the Central Bureau of Statistics in The Netherlands in their periodic Health Interview Surveys (CBS, 1989). To reduce potential reporting bias by patients, only 'active' conditions were included – that is, conditions for which a GP or specialist was consulted, or

for which medicines were used during the 12 months prior to the interview. To reduce the number of CMC categories, other lung conditions were combined with asthma/bronchitis; multiple sclerosis was combined with other central nervous system conditions; and liver, kidney and thyroid conditions were pooled into a single category. These consolidations were justified on the basis of the low prevalence of the conditions in question and on similarities in their patterns of association with the measures of anxiety, depression and disability. Two CMCs, chronic headache/migraine and back problem, were excluded from the analyses because of possible confounding with distress. This resulted in 16 active CMCs including the three impairments discussed below.

Sensory impairments

These were measured with the OECD 2-item indicator for hearing problems and the OECD 2-item indicator for vision problems (the range for both is 2–8) (McWhinnie, 1981).

Cognitive impairments

These were assessed with the MMSE (Folstein *et al.* 1975), which captures cognitive impairment generally (e.g. orientation in time and place, aspects of memory function). Higher scores indicate better functioning. The score was dichotomized using the conventional cut-off score of 24.

Socio-economic status (*SES*)

This was measured by an index based on net household income and subject's educational attainment (UNESCO, 1976) and prestige of the last job held (Sixma & Ultee, 1984; Thijssen, 1986). The three components correlated at approximately 0·45 and were weighted equally.

Mediators

Physical disability

The entire dimension of physical functioning was crudely assessed with the 6-item physical functioning subscale of the Medical Outcome Study (MOS) Short-Form General Health Survey (SF-20) (Stewart *et al.* 1989). Items ranged from vigorous activities to basic personal care activities such as dressing oneself. The 18-item Groningen Activity Restriction Scale (GARS; Kempen & Suurmeijer, 1990) was used to obtain a detailed measure of limitations in (Instrumental) Activities of Daily Living ((I)ADLs). The results of previous studies showed that both the MOS subscale and the GARS have excellent psychometric properties (Cronbach's alphas of 0·79 and 0·91, respectively) and meet the stochastic cumulative scalability criteria of the Mokken model (Kempen & Suurmeijer, 1990).

Role disability

This was assessed with the Social Functioning List (Brilman & Ormel, 1994), a 15 min structured interview that covers professional role, housekeeping role, partner role and social role. If one or more of the first three roles was not applicable due to non-health problems (such as retirement, bereavement, or spouse handling the housekeeping), the respondent's most important structural activity (for example, doing jobs around the house) was rated instead. The interviews were coded according to the Role Functioning Limitation index (Brilman & Ormel, 1994), which indicates the extent to which subjects feel limited in role performance as a result of health problems. For each role (or structural activity) the rating categories were: no limitation, some limitation, moderate limitation, and severe limitation. Non-performance due to poor health was rated as severe limitation. Factor analysis revealed uni-dimensionality and reliability analysis showed moderate internal consistency (alpha = 0·75), so the ratings were summed across roles and structural activities. To maintain comparability with non-Dutch studies, the MOS SF-20 2-item role functioning subscale was also administered (alpha = 0·87).

Psychosocial resources

Three psychosocial resources were measured: mastery, self-efficacy and social support. Mastery, measured with the seven-item mastery scale developed by Pearlin & Schooler (1978), reflects the extent to which one feels one's life-chances are under one's control (in contrast to being ruled fatalistically). Self-efficacy was measured with the self-efficacy scale developed by Sherer *et al.* (1982) and adapted by Bosscher *et al.* (1992). The scale is composed of 16 items and reflects differences in the belief that one can successfully perform certain behaviours. Social support, measured with the 12-item Social Support List (SSL12-I; Kempen & VanEyk,

1995), reflects the extent of perceived social support received through social interactions with members of a person's primary social network. Cronbach's alphas were 0·79, 0·84 and 0·83 for mastery, self-efficacy and social support, respectively, indicating satisfactory internal consistency.

Psychological distress

Psychological distress in the form of depressive symptoms and anxiety symptoms was assessed with the 14-item Hospital Anxiety and Depression Scale (HADS) (Aylard *et al*. 1987). The depression items target the affective and cognitive aspects of depressive illness, in particular symptoms of mild endogenous depression. Because somatic items are not included, the depression subscale is less sensitive to confounding by medical illness. Each of the HADS' two 7-item subscales varies from 0 to 21, with higher scores indicating more symptoms. Internal reliability estimates were 0·71 (depression), 0·83 (anxiety), and 0·84 (total scale). The subscales correlated 0·54. For some analyses, scores were dichotomized using the cut-off score of 8 for the subscales and 12 for the total scale. Test–retest reliability and criterion validity of the HADS as assessed with the Index of Definition of the Present State Examination are good (Spinhoven *et al*. 1997).

Statistical analysis

The general linear model was used to estimate adjusted differences in mean distress level, disability and psychosocial resources of subjects who had a particular CMC and those who did not have that condition. These difference scores were adjusted for gender, age, SES, marital status and all other CMCs. The measures of distress, disability and resources were treated as outcome variables. Predictive variables were sociodemographics (gender, age, SES and marital status), and each of the 16 types of CMCs (including hearing impairment, vision impairment and cognitive impairment). The three impairment variables were dichotomized for comparability with the binary representation (present *v*. absent) of the medical conditions. Stepwise multiple regression was used: (*i*) to estimate the unique contribution of sociodemographics, disability, resources and each type of CMC in explaining variance in psychological distress; and (*ii*) to test the hypothesis that the mental health effects of type of CMCs are mediated by disability and/or resources. Three stepwise regression analyses were executed, with as dependent variables, respectively, the HADS depression subscale, the HADS anxiety subscale and the HADS total scale. Since the results for the subscales did not differ much, we present only the results for the total scale.

The standard errors and inference statistics presented here have not been adjusted for the clustered sampling design. Although subjects were drawn from the panels of 27 GPs, intraclass (within GP) correlations were very small (ranging from 0·019 to 0·0009). Given the large number of GPs, pooling of the sample should have minimal effects on inference statistics.

RESULTS

Sample characteristics

Sample characteristics are presented in Table 1. As expected, women outnumbered men. Significant distress (HADS score 12+) was found among 24·5% of the sample, significant depressive symptoms (HADS-D 8+) among 17% and significant anxiety symptoms (HADS-A 8+) in 14·7% of the sample. These rates are similar to findings in a recent population-based sample in the central region of The Netherlands (Penninx *et al*. 1996). The six most prevalent chronic medical conditions were hypertension (22·8%), heart conditions (17·4%), arthritis (14·0%), lung conditions (11·0%), vision impairment (7·5%), and diabetes mellitus (7·0%).

Unique differences in distress, disability and psychosocial resources between types of CMCs

Are specific chronic medical conditions related to differences in psychological distress, disability and psychosocial resources? Table 2 shows for each type of CMC the unique (or adjusted) difference in mean between subjects with the particular type of CMC and those without. The adjusted difference in mean should be interpreted proportionally to the standard deviation of the outcome variable, presented in Table 1. The five most 'distressogenic' conditions were (ordered by size of effect): hearing impairment, neurological conditions, lung conditions, heart conditions and visual impairment. The depression

Table 1. *Characteristics of the study population* (N = 5078)*†

	%	*N*
Gender		
Female	55·8	2832
Male	44·2	2246
Age		
55–64	36·1	1834
65–74	41·0	2083
75–84	22·9	1161
SES, mean (S.D.)	175 (57)	
Partner, yes	69·1	3510
Depression and anxiety symptoms		
Mean (S.D.)	8·2 (6·3)	
Score 12+	24·5%	1242
Active chronic medical conditions		
Lung conditions	11·0	561
Heart conditions	17·4	886
High blood pressure	22·8	1157
Stroke (consequences of)	2·3	119
Leg wounds	1·0	53
Gastrointestinal conditions	4·9	247
Liver/gall/kidney condition	6·2	313
Prostate problem	2·9	145
Diabetes mellitus	7·0	355
Arthritis	14·0	711
Serious skin conditions	6·2	315
Malignant neoplasms (in remission)	3·2	161
Neurological conditions	1·6	83
Hearing problem	4·4	225
Vision problem	7·5	381
Mild cognitive impairment	5·2	262
None of the above	31·3	1591
Disability, mean (S.D.)		
MOS physical function (+)	69·0 (29.0)	
GARS disability in (I)ADL (−)	22·6 (7.6)	
MOS role function (+)	74·9 (40.7)	
SFL role dysfunction (−)	2·2 (2.9)	
Psychosocial resources, mean (S.D.)		
Mastery (+)	24·8 (5.3)	
Self-efficacy (+)	60·2 (11.4)	
Social support (+)	25·5 (4.9)	

* Due to missing values not all numbers add up to 5078.
† Higher score (+) indicates better functioning or high resources; higher score (−) indicates poor functioning or low resources.

and anxiety subscales of the HADS showed patterns of associations with type of CMC that were largely similar to the one observed for the total distress scales. The largest differences were found for leg wounds and gastrointestinal diseases, which were more strongly associated with anxiety (difference of means: 1·1 and 0·9) than with depression (0·5, 0·4), and for diabetes and neurological conditions, which were more strongly associated with depression (0·6, 1·0) than with anxiety (0·2, 0·5).

The five conditions that were most strongly associated with physical functioning (MOS scale) were: neurological conditions, stroke, arthritis, lung conditions and leg wounds. The five conditions that were most strongly associated with (I)ADL were: neurological conditions, stroke, leg wounds, vision impairment and arthritis. The conditions that showed the strongest negative associations with role functioning were: neurological disease, leg wounds, arthritis, lung conditions, stroke and vision impairment.

The five conditions that were most powerfully associated with mastery were: neurological disease, hearing impairment, vision impairment, stroke and leg wounds. Conditions relating most strongly to self-efficacy were: hearing impairment, neurological disease, vision impairment cognitive impairment, and leg wounds. Only one condition – hearing impairment – was associated with low social support.

Some of the conditions associated with much physical and role disability – most notably neurological conditions, lung conditions, and heart disease – were also associated with low psychosocial resources, but other disabling CMCs (diabetes and leg wounds, for example) showed little or no association with mastery and self-efficacy. In contrast, some moderate- and low-disabling conditions – in particular the sensory and cognitive impairments – were strongly associated with low mastery and low self-efficacy.

These data suggest that the mental health effects of most CMCs are mediated by disability, whereas the mental health effects of hearing and vision problems, lung and heart conditions, neurological conditions and cognitive impairment could flow via both disability and reduced mastery and self-efficacy.

Do disability and psychosocial resources mediate mental health effects? Stepwise regressions

Stepwise multiple regression was used to examine whether CMC-specific differences in mental health could be explained by the differential effects of CMCs on disability and resources. The results are presented in Table 3.

While standardized regression coefficients take the prevalence of the CMC into account, adjusted differences of means do not. For this reason, low prevalent types of CMC with large adjusted differences in mean distress will account

Table 2. *Adjusted difference in mean psychological distress, disability and psychosocial resources between those with the chronic medical condition and those without*†‡

	Psycho-logical distress (−)	Physical disability		Role disability		Psychosocial resources		
		MOS (+)	(I) ADL (−)	MOS (+)	SFL (−)	Mastery (+)	Self-efficacy (+)	Support (+)
Lung conditions	1·77***	−13·80***	2·47***	−15·90***	1·31***	−1·06***	−1·90***	0·06
Heart conditions	1·69***	−12·19***	1·69***	−17·58***	0·86***	−1·01***	−1·30**	0·31
High blood pressure	0·22	−2·63**	−0·11	−1·80	0·14	−0·32	−1·03**	−0·01
Stroke (consequences of)	0·46	−18·39***	7·62***	−17·92***	1·46***	−1·55**	−1·57	0·86
Leg wounds	1·57	−13·75***	5·36***	−23·95***	1·78***	−1·21	−2·57	0·69
Gastrointestinal	1·64***	−5·85***	1·27**	−12·37***	0·60**	−0·55	−0·02	0·35
Liver/gall/kidney	0·78*	−4·57**	1·05**	−7·37***	0·65***	−0·10	0·47	0·36
Prostate	0·64	−3·81	0·11	−2·73	0·21	−0·51	−1·27	−0·09
Diabetes mellitus	0·73*	−6·64***	2·48***	−11·68***	0·59***	−0·14	−0·90	0·46
Arthritis	1·53***	−17·71***	3·70***	−22·10***	1·29***	−0·71***	0·06	0·56**
Skin	0·79*	−1·04	0·34	1·67	0·03	−0·62*	0·07	0·07
Cancer	0·49	−4·38*	0·99	−14·16***	0·33	−1·02*	0·40	0·26
Neurological condition	1·72**	−19·95***	9·47***	−25·71***	1·98***	−2·70***	−4·61***	0·19
Hearing impairment	2·82***	−9·22***	2·52***	−15·70***	0·77***	−2·54***	−4·60***	−1·22***
Vision impairment	1·68***	−7·72***	3·88***	−15·18***	0·94***	−2·19***	−4·22***	−0·24
Cognitive impairment	0·91*	−4·38**	1·42***	−5·89*	0·47**	−1·17***	−3·37***	0·41
No active condition§	6·5	81·8	20·2	91·3	1·2	26·0	62·2	25·2

* $P < 0{\cdot}05$; ** $P < 0{\cdot}01$; *** $P < 0{\cdot}001$.

† Adjusted for demographics and all other chronic medical conditions (CMCs).

‡ (+) Denotes that higher scores indicate better functioning or high resources; (−) denotes that higher score indicates poor functioning or low resources.

§ Entries for persons without any active chronic medical condition denote absolute means adjusted for demographic characteristics (sex, age, SES, partners).

at best for moderate to small proportions of variance in distress at best. On the other hand, high prevalent types of CMCs with small or moderate adjusted differences in mean distress may account for relatively large proportions of variance in distress.

The 16 types of CMCs accounted for 9% of the variance in distress (data not shown). The five largest contributions were provided by arthritis (beta = 0·11), hearing impairment (0·10), vision impairment (0·10), lung diseases (0·09) and heart conditions (0·08). Table 3 shows that the sociodemographic variables accounted for 6% of the variance in psychological distress, and the contribution of types of CMCs dropped to 7% after adjusting for the sociodemographic variables. The disability variables accounted for 13% and the psychosocial resources for 14% (Regression B in Table 3). The contribution of types of CMCs dropped to 1% when adjusted for disability and psychosocial resources.

Jointly disability and psychosocial resources mediated the mental health effects of nearly all types of CMCs. The extent to which each mediator contributed to this depended on the order they were entered in the stepwise regression analysis (data not shown). When disability was entered first and then resources, the initial 9% variance accounted for by the CMCs dropped first to 2·4%, and, after adding psychosocial resources, to 1·5%. This suggests that disability alone mediated most of the effect of CMCs on distress.

Alternatively, when resources were entered first and then disability, the initial 9% variance accounted for by the CMCs dropped first to 3·4%, and, after adding disability, to 1·4%. This suggests that resources are also an important mediator. Apparently, disability and psychosocial resources share to a large extent their mediating potential, although they were only moderately correlated (Pearson correlation coefficient averaged 0·30). This sharing was most prominent for neurological conditions and cognitive impairment. Unfortunately, the data do not allow us to disentangle which pathways in Fig. 1 conveyed exactly what part of the mediation. But the amount of mediation shared by disability and psychosocial resources suggests that paths c or f, or both, played an important role.

The mediating role of disability was most

Table 3 *Results of two stepwise multiple regression analyses to examine the hypothesis that disability and psychosocial resources mediate the mental health effects of specific chronic medical conditions*†‡

	Psychological distress (dependent variable)	
Predictors	Regression A Step 1: Demogr. Step 2: Conditions	Regression B Step 1: Demogr. Step 2: Disability Step 3: Resources Step 4: Conditions
Sociodemographics	$R^2 = 0{\cdot}06$	$R^2 = 0{\cdot}06$
Gender (male–female)	0·13***	0·08***
Age (interval)	−0·04**	−0·10***
SES (interval)	−0·12***	−0·03*
Partner (yes–no)	0·06***	0·06***
Disability		$R^2 = 0{\cdot}19$ R^2 (change) = 0·13
MOS physical (+)		−0·10***
GARS (I)ADL (−)		−0·01
MOS role MOS (+)		−0·02
SFL role (−)		0·11***
Resources		$R^2 = 0{\cdot}33$ R^2 (change) = 0·14
Mastery (+)		−0·29***
Self-efficacy (+)		−0·17***
Support (+)		−0·01
Chronic medical conditions (CMCs)	$R^2 = 0{\cdot}13$ R^2 (change) = 0·07	$R^2 = 0{\cdot}34$ R^2 (change) = 0·01
Lung conditions	0·08***	0·02
Heart conditions	0·11***	0·04***
Hypertension	0·02	−0·01
Stroke	0·02	−0·01
Leg wounds	0·03*	0·01
Gastrointestinal	0·07***	0·05***
Liver/gall/kidney	0·04*	0·03*
Prostate	0·01	−0·01
Diabetes mellitus	0·03	0·01
Arthritis	0·08***	0·03*
Skin	0·02	0·01
Cancer	0·01	−0·00
Neurological	0·04*	−0·02
Hearing impair.	0·10***	0·04**
Vision impair.	0·08***	0·01
Cognitive impair.	0·02	−0·01

* $P < 0{\cdot}05$; ** $P < 0{\cdot}01$; *** $P < 0{\cdot}001$.
† Entries denote standardized regression coefficients.
‡ Higher score (+) indicates better functioning or high resources; higher score (−) indicates poor functioning or low resources.

pronounced for arthritis, lung condition and heart disease, whereas the mediating role of mastery and self-efficacy appeared most salient for hearing and vision impairments. The other conditions were generally mediated by disability as well as mastery and self-efficacy. Although three types of CMCs (heart disease, gastrointestinal disease and hearing impairment) were still significantly ($P < 0{\cdot}01$) associated with distress after controlling for disability and resources, the drop in the beta values from regression A to B showed that disability and resources did also partly mediate the effect of these three CMCs on distress.

Apart from mediating effects, physical and role disability as well as mastery and self-efficacy (but not social support) accounted for substantial variance in psychological distress. The contribution of mastery (beta = −0·29) was by far the strongest.

Psychological distress was more prevalent among women, the younger old, and those who had no partner due to bereavement or divorce than among men, the very old and those with a partner. Socio-economic status was unrelated to psychological distress, after controlling for mastery and self-efficacy. The association with gender was largely due to anxiety symptoms, not depressive symptoms.

DISCUSSION

This study clearly demonstrated CMC-specific levels of psychological distress. Some types of CMCs are associated with high levels of distress whereas others are not. Among different types of CMCs, there were also considerable differences in physical and role dysfunction, and in mastery and self-efficacy, but not in social support. The pattern of differences in disability and psychological resources across types of CMCs largely paralleled the pattern of differences in distress. The CMC-specific gradients in psychological distress could largely be accounted for by the CMC-specific gradients in disability and, to a lesser extent, in mastery and self-efficacy. These results support the convential wisdom that it is not the nature of the type of condition that determines psychological distress, but instead the severity of the disability and loss of resources associated with the condition on the one hand and the psychological characteristics of the patient on the other.

Causal interpretations

A few qualifications must be considered in interpreting these findings. As with any cross-sectional study, it is not appropriate to draw causal inferences. While it is likely that physical

and psychosocial changes related to chronic medical conditions (e.g. loss of resources and disease-related negative life events and long-term difficulties such as disabilities) can cause anxiety and depression, anxiety and depression may also cause disability, loss of psychosocial resources, and even worsen chronic medical conditions. Behavioural mediators of this effect of psychological distress on physical health might be poor self-care and disease management such as lack of motivation to seek appropriate medical attention and rehabilitation or to follow treatment regimens. Physiological pathways, mediated by disuse or immunological factors, are also possible. The complexity of possible causal pathways is illustrated by the findings of Aneshensel *et al*. (1984), who, using multiwave longitudinal data, found that illness exerted a large, immediate effect on (increasing) depressive symptomatology, while depression showed a smaller, 4-month lagged effect on (increasing) levels of physical illness. This suggests a reinforcement cycle operating over time. The best strategy to dissect these possible causal pathways is a prospective study of individuals at high risk of developing chronic conditions, with premorbid measures of disability, psychosocial resources, depression and anxiety. As soon as chronic disease arises, frequent measurement occasions are needed to date changes in disability, resources and distress. Only then it will become possible to test competing causal hypotheses.

Alternatively, the observed associations might be due to a common factor, such as biological disruptions caused by chronic medical disease and leading to affective dysregulation. Candidate pathogenetic mechanisms include: (*i*) imbalance in the availability and working of neurotransmitter systems; (*ii*) disruptions in the HPA-system; and (*iii*) abnormalities in the immune system. These three systems are related in complex ways, and might easily be disrupted by some chronic medical diseases. It is not inconceivable that severity of disease correlates with severity of disruption in these systems, which in turn might lead to depressive and anxiety symptoms. In this common factor model, disability and psychological resources would be less important, since the covariances between CMCs, disability, resources and mental health would have a common cause: severity of CMC in terms of biological disruption. Whatever the value of this common factor hypothesis, it is difficult to see how it could account for the unique association of hearing and vision impairments with distress.

Other limitations

When compared with the source population, i.e. the population in the north of The Netherlands aged 57–85, the research sample contains two potential biases: GP selection bias and non-response bias. (1) Although the RNG-GPs do not constitute a random sample from the population of GPs in the north of The Netherlands, it is unlikely that the selection of GPs caused any bias. There is no evidence that the composition of the patient panels of the RNG-GP practices differs from those of non-RNG GP practices in terms of socio-demographics, morbidity and utilization (Relyveld, 1996). (2) Non-response was associated with gender (4% higher in females) and age (6% higher in the 70–84-year-olds). Computerized health-care utilization records were available for 55% of the study population. Comparing these records for responders and non-responders suggested relatively high non-response in four categories of subjects (Relyveld, 1996): those with advanced malignant neoplasms, those with significant cardiac surgery, those with a history of suicide attempt and those who had not consulted a GP in the past 12 months. This suggests elevated non-response in the very sick (life-threatening disease, severe depression) and the very healthy. Whether these trends have neutralized each other is unclear. By eliminating the extremes of the distribution, the overall effect of this pattern of non-response was probably to diminish the strength of the associations in question. Nevertheless, the high non-response in the very sick limits the generalizability of our findings to community-dwelling elderly who are very ill.

The measurement of psychological distress could be confounded with the measurement of disability. As 'impairment' criteria are not used in the items of the HADS, such confounding is unlikely in the present study. But it cannot be excluded that patients with high levels of symptoms of depression and anxiety may have given unrealistically pessimistic appraisals of their disabilities (Kempen *et al*. 1997*b*).

Three comments should be made about the measures of chronic medical conditions. As in most studies in the literature, the presence of CMCs was established using patient reports. The biomedical severity of the conditions was not assessed. First, available evidence suggests that conclusions about the functioning and well-being of patients with various CMCs are similar whether the data on presence of CMCs are reported by patients or physicians (Stewart *et al.* 1989). Secondly, in the present study, the definition of chronic medical conditions was limited to active conditions (that is, conditions for which a physician was consulted and/or medications had been taken on a regular basis during the preceding 12 months), and this criterion should enhance the accuracy of self-reports. Thirdly, a recent Dutch study (Kriegsman *et al.* 1997) showed only moderate discrepancies between self-reports and GP records for joint diseases, small discrepancies for diabetes, and intermediate discrepancies for other chronic medical conditions. Furthermore, the presence of depressive symptoms was not associated with either over- or under-reporting of CMCs.

Differences between chronic medical conditions

Chronic medical conditions varied in the extent they were associated with psychological distress. In this study, high levels of depressive and anxiety symptoms were experienced by patients with hearing impairment, neurological disease, lung and heart conditions, neurological conditions, gastrointestinal diseases, vision impairment and arthritis. Patients with skin conditions, high blood pressure, liver/gall/kidney diseases, diabetes, cancer (in remission) and prostate problems appeared to be least distressed psychologically. The interpretation of these findings should take into account the nature of the population (community-dwelling elderly) and the relatively high non-response level among the very sick (see below). Comparison of these findings with earlier research is hampered by the fact that most studies used in-patients with a wide variety of medical conditions (Cassileth *et al.* 1984; Cavanaugh, 1984; Koenig *et al.* 1988; Arpin *et al.* 1990; Coulehan et al. 1990) in which severity and phase of conditions may have been different from those of the chronically ill out-patients in the present community-based sample. Furthermore, comparison must be restricted to depression, as other psychological outcomes were scarcely considered in previous studies. Given these limitations, and the paucity of data on CMC-specific depressive symptoms, previous research is reasonably consistent with the findings presented here (Felton & Revenson, 1984; Coulehan *et al.* 1990; Palinkas *et al.* 1990; Beekman *et al.* 1995). Stroke patients, however, constitute an exception. In the present study, stroke patients reported high levels of disability and loss of psychosocial resources, but they seemed to experience less anxiety and depression than reported by other researchers (Murrell *et al.* 1983; Felton & Revenson, 1984; Palinkas *et al.* 1990). Most cancer patients in the present study were long-term 'survivors' of cancer. These cancer patients did not show an extra risk of anxiety and depressive symptoms in comparison with patients who had other chronic medical conditions. This finding is in line with the observations of Murell *et al.* (1983), Cassileth *et al.* (1984), Koenig *et al.* (1988), Palinkas *et al.* (1990).

Disability, mastery and self-efficacy

The mental health effect of CMCs flows via disability and psychological resources. Disability was the most important mediator, either bringing about distress directly or indirectly, i.e. by reducing mastery and self-efficacy, which in turn affects distress. However, for hearing and vision impairment, the mental health effects appeared to be carried forward largely by reduced mastery and self-efficacy only. The underlying process may be that people with sensory impairments not only lose valued activities, but independently of that also encounter additional losses of their sense of control and self-confidence. All this may lead them to view themselves, their future, and their world more negatively (Friedland & McColl, 1992), resulting in feelings of depression and anxiety.

Disability and psychosocial resources accounted for 13% and 14% of the variance in distress respectively. In particular, mastery and self-efficacy were strongly associated with distress. This emphasizes their significance as independent, i.e. not CMC-related, determinants of mental health in older people.

Sociodemographic characteristics

In this study, as in the findings of Berkman *et al*. (1986), Blazer *et al*. (1991), and Penninx *et al*. (1996), the addition of chronic conditions to a multivariate model that included age reversed the associations of age with anxiety and depressive symptoms. After adjusting for chronic medical disease status, age was negatively associated with psychological distress. This suggests that age effects on anxiety and depressive symptoms are largely accounted for by medical health status. In agreement with Aneshensel *et al*. (1984), Turner & Noh (1988) and Penninx *et al*. (1996), young–old and old–old in the present study did not show differences in the relationships between chronic medical conditions and mental health.

Conclusion

Although any causal interpretations should be evaluated against the background of the cross-sectional design, this study demonstrated that the level of psychological distress varies across type of medical condition and impairment. This gradient in distress could largely be accounted for by the corresponding gradients in disability and, to a lesser extent, in mastery and self-efficacy. This is in line with the convential wisdom that it is not the nature of the condition that determines psychological distress, but instead the severity of the disability associated with the condition on the one hand and the psychological characteristics of the patient on the other.

The research reported is part of the Groningen Longitudinal Ageing study (GLAS). GLAS is conducted by the Northern Centre for Health Care Research (NCG) and various Departments of the University of Groningen (RUG), The Netherlands. The primary departments involved are Health Sciences (Prof. dr W. J. A. van den Heuvel), Family Medicine (Prof.dr B. Meyboom-de Jong), Psychiatry (Prof. dr J. Ormel), Sociology (ICS) (Prof. dr S. M. Lindenberg) and Human Movement Sciences (Prof. dr P. Rispens). Director of GLAS is Prof. dr J. Ormel (Health Sciences and Psychiatry). GLAS and its substudies are financially supported by the Dutch government (through NESTOR), the University of Groningen, the School of Medicine, the Dutch Cancer Foundation (NKB/KWF), and The Netherlands Organization for Scientific Research (NWO). The central office of GLAS is located at the NCG, Antonius Deusinglaan 1, 9713 AV Groningen, The Netherlands.

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